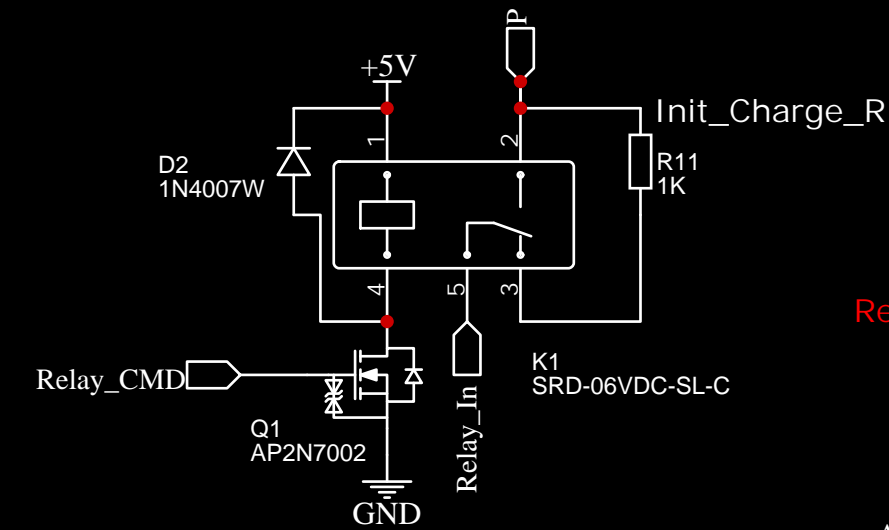


Finding the required capacitance for smooth DC:
Farad = Ampere*second/Volt
Ampere = 8[A]
second = 1/(2*50[Hz])=0.01[sec] (Twice the freq due to bridge rectifier)
Volt = Allowable voltage drop ~ 10% of input ~ 30[Volts]
Ampere*second/Volt -> 8*0.01/30 = 2666[uF]

Bleeder resistor:
 $R = -t/(C*\ln(V_{safe}/V_{init}))$
To find out how much power will be dissipated on the resistor:
 $P_{Peak} = V_{init}^2/R$
 t - Time to bleed [sec]
 C - Capacitance [F]
 V_{safe} - Minimal voltage to discharge to [V]
 V_{init} - Voltage in the capacitor [V]
 P - Power to dissipate on the resistor [W]
 $R = -150/(1e-3*\ln(10/325)) = 43088 \text{ [Ohm]}$
I'll put 4, 10000 [Ohm] resistors w/ 2W capacity
 $P(\text{Per resistor}) = (325/4)^2/10000 = 0.66\text{[W]}$

$I_{LED} = 325/40000 = 8\text{[mA]}$
Tested LED, still gives light at 1[mA]



Relay for initial capacitor charging through resistor
So initial charging current isn't too high.
Charge for at least 3 time constants = 3[sec]

Inputs

Supply voltage: 310 V

Capacitance: 1000 µF

Series Resistance: 1000 Ω

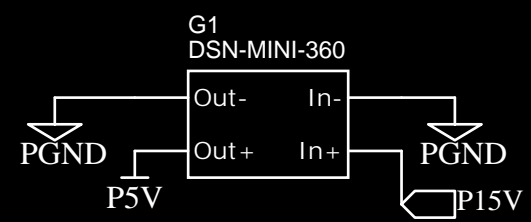
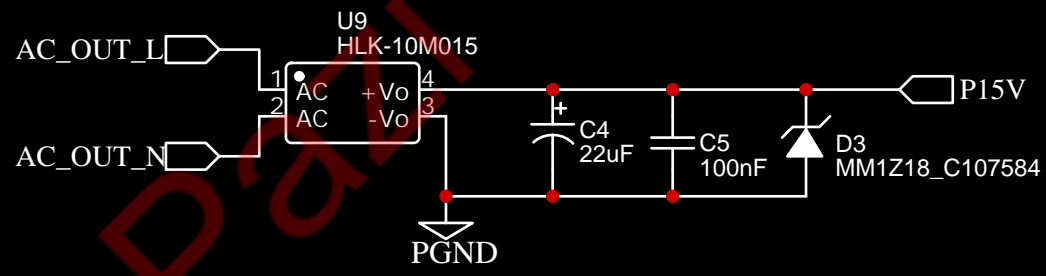
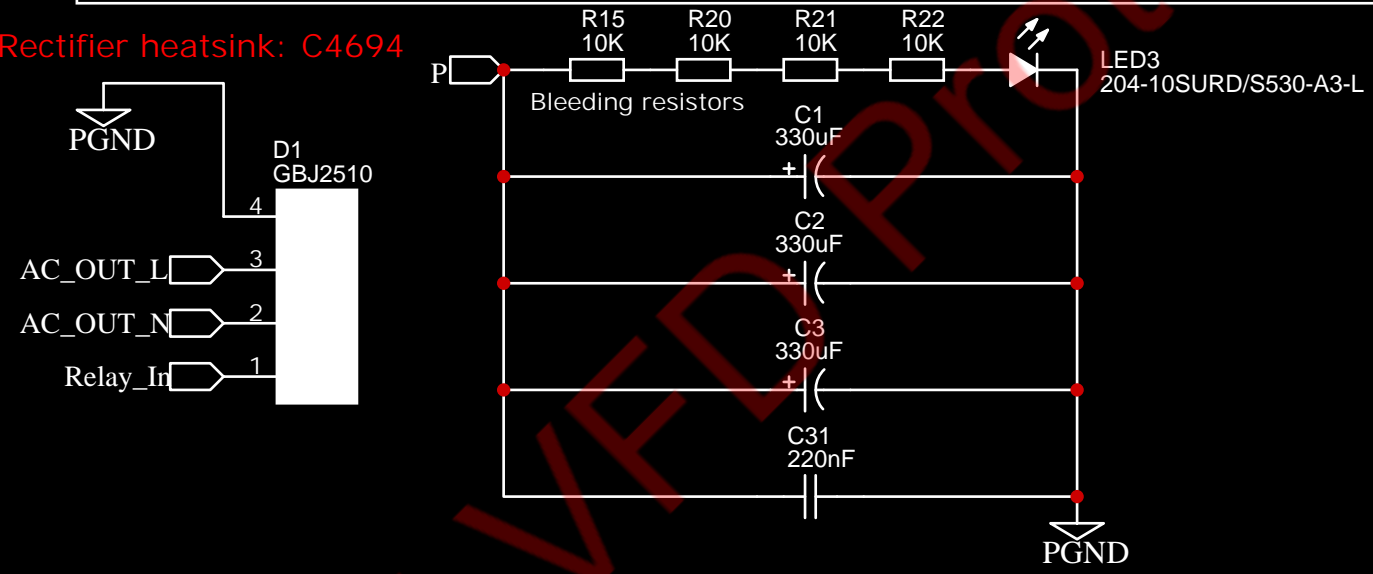
Calculate

Outputs

Energy: 48.0 Joules

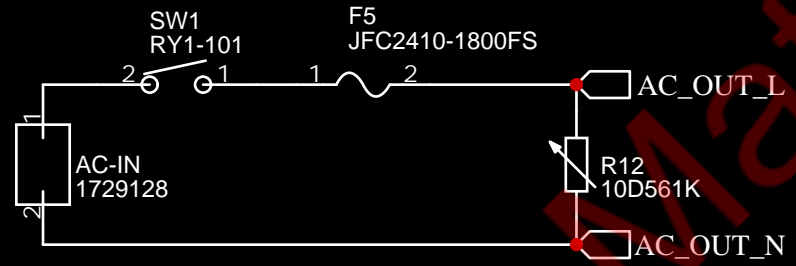
Time Constant: 1.00 seconds

Rectifier heatsink: C4694



Fix: Need to add a reverse diode for 5V DC-DC

Consider using DPST instead of SPST to connect to N as well



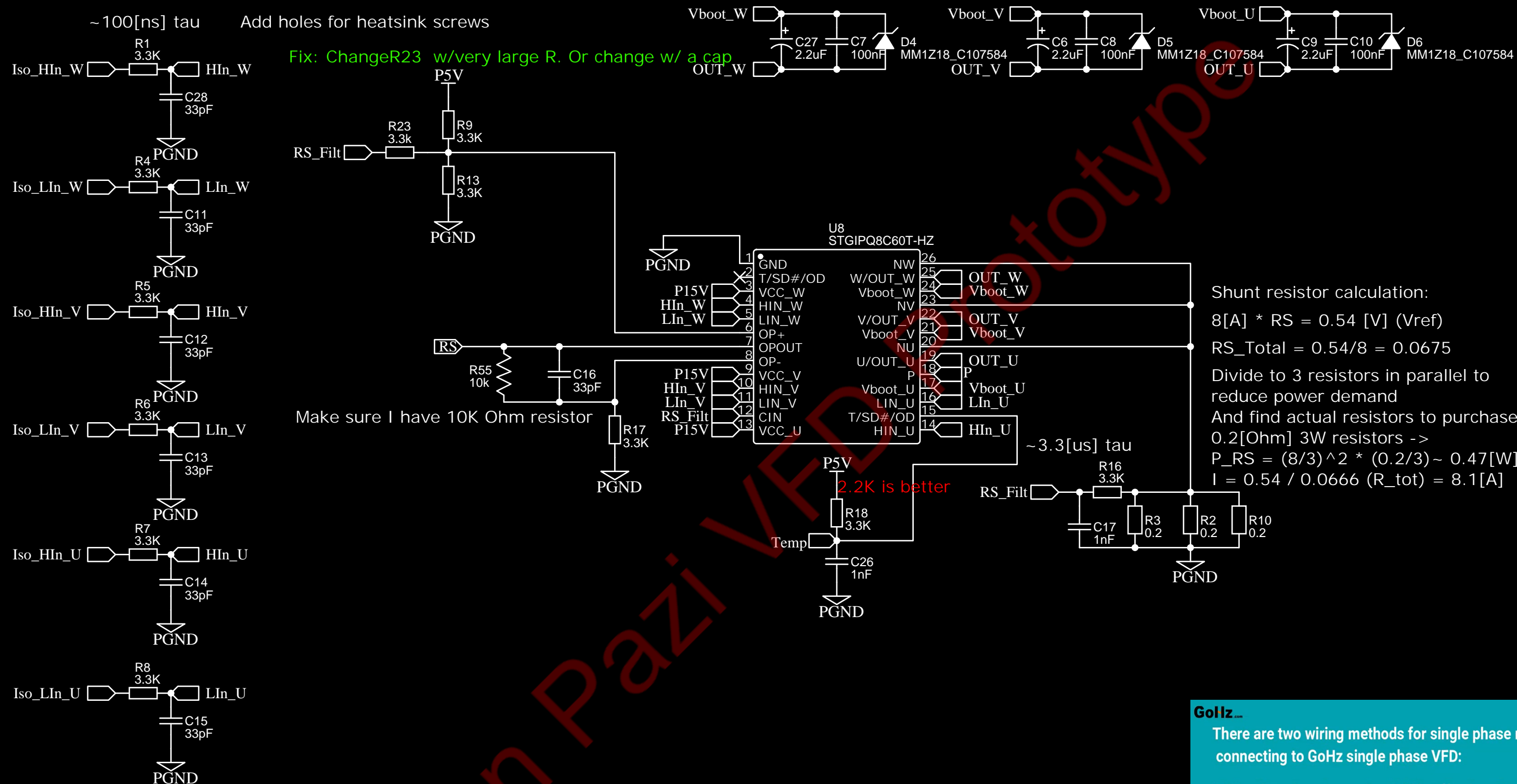
Fix: Switch HLK-10M05 + and - terminals
Maybe take the HLK-10M015 model from above and change it's name. Its terminals are correct

TITLE: Power		REV: 1.0
EasyEDA	Company: Your Company	Sheet: 1/1
	Date: 2021-05-17	Drawn By: MatanP

IPM Heatsink: C286209

Add holes for heatsink screws

Fix: Change R23 w/very large R. Or change w/ a cap



Shunt resistor calculation:

$$8[A] * RS = 0.54 [V] (V_{ref})$$

$$RS_{Total} = 0.54/8 = 0.0675$$

Divide to 3 resistors in parallel to reduce power demand

And find actual resistors to purchase

$$P_{RS} = (8/3)^2 * (0.2/3) \sim 0.47[W]$$

$$I = 0.54 / 0.0666 (R_{tot}) = 8.1[A]$$

Bootstrap capacitor selection from app note AN4043

Cap. voltage should be a few volt higher than Vcc (15V) due to a few voltage drops

Need to charge bootstrap capacitor by sending

PWM to Low side IGBTs first for a few [ms]

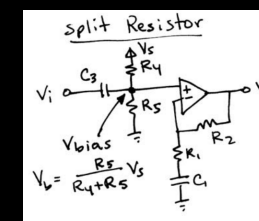
Zener diode voltage not to exceed bootstrap capacitor voltage

Need 15V power supply for IPM

Need ~5V power supply for Digital isolators, microcontroller & relay

$$G_{AIN} = (1 + \frac{R_2}{R_1}) = G_1$$

$$V_o = G_1 V_i + V_b$$

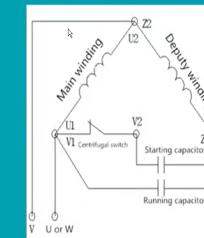
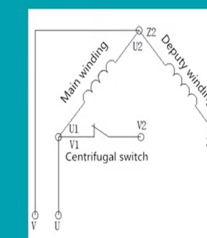


"How to bias an op-amp"

GoHz.com

There are two wiring methods for single phase motor connecting to GoHz single phase VFD:

A. Wiring of removing motor capacitor B. Wiring of keeping motor capacitor



TITLE:

IPM

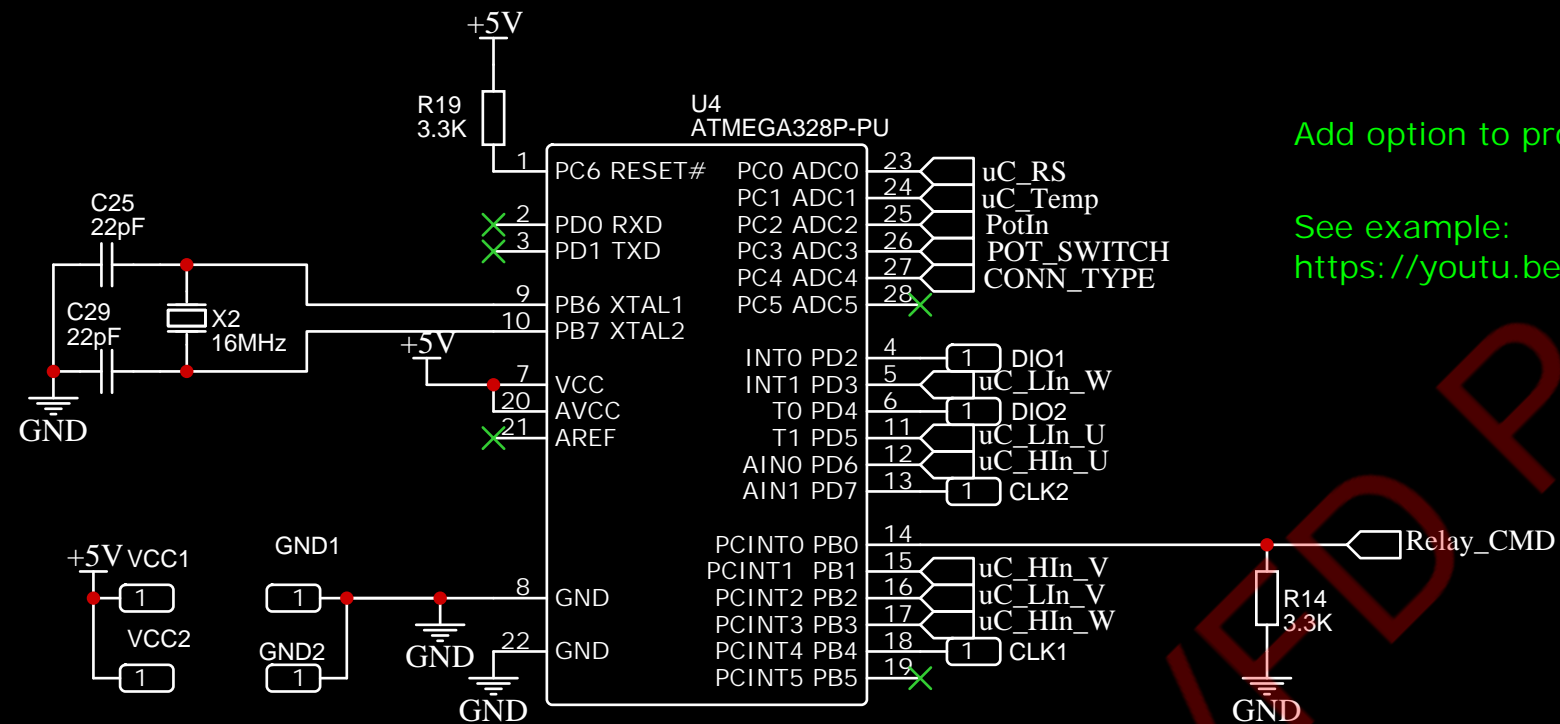
REV: 1.0

EasyEDA

Company: Your Company

Sheet: 1/1

Date: 2021-08-07 Drawn By: MatanP



Add option to program and add USB port

See example:

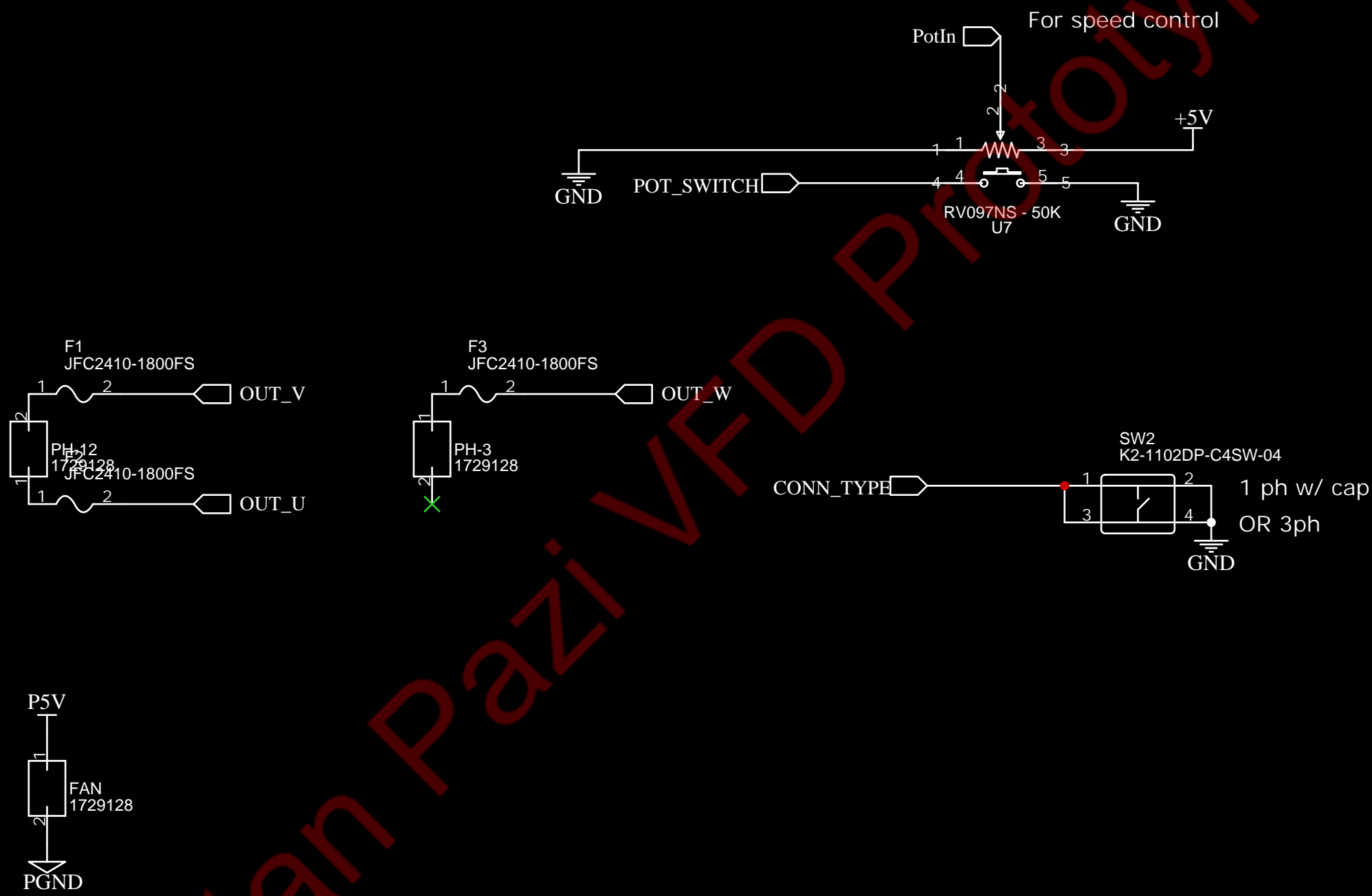
<https://youtu.be/VdkloigaxZo?list=PLsR1AO4QH1AxYrKPmh2e3LDeTyNWdyEXb&t=168>

4 digit led for speed in [Hz] & connection type (1 ph, 3 ph ..)

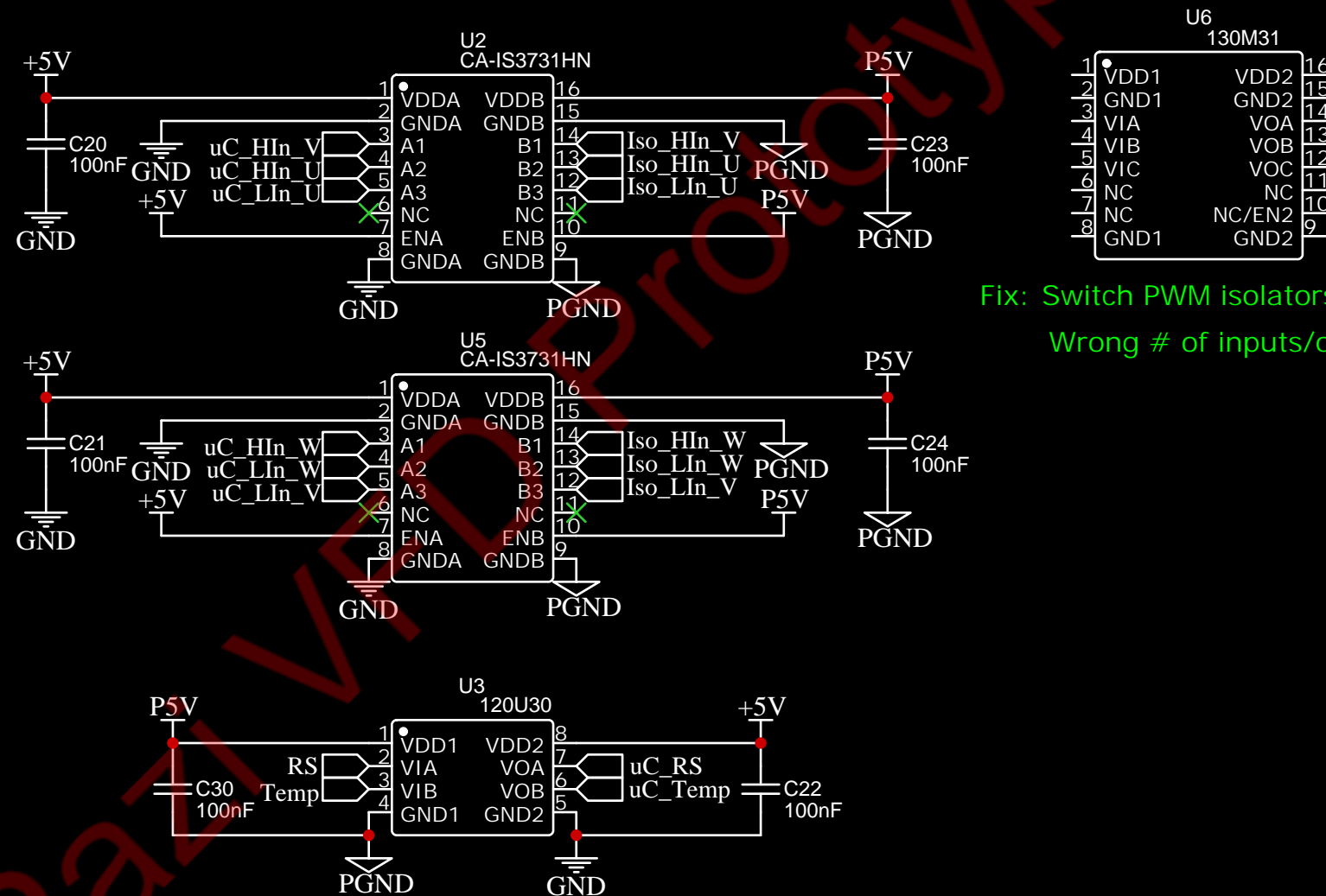
4 digit led for current in mA

Pulled low to be sure it's low on power on

TITLE: uC + Display		REV: 1.0
EasyEDA	Company: Your Company	Sheet: 1/1
	Date: 2021-08-29	Drawn By: MatanP



TITLE: Miscellaneous		REV: 1.0
	Company: Your Company	Sheet: 1/1
	Date: 2021-08-29 Drawn By: MatanP	



Fix: Switch PWM isolators to Pi isolators
Wrong # of inputs/outputs

TITLE: Isolators		REV: 1.0
	Company: Your Company	Sheet: 1/1
	Date: 2021-10-24	Drawn By: MatanP